REMARKS

In accordance with the foregoing, claims 1, 14, 15 and 17 are amended. No new matter is added. Claims 1, 3, 6-9, and 12-20 are pending and under consideration.

Claims 1, 14, 15 and 17 are amended to specify that "a wavelength λ_s of said signal light of said input port is different from said wavelength λ_c of said continuous wave." Independent claims amendments are fully supported by the originally filed specification. For example, on page 19, lines 12-19, it is described the bandpass filter 28 of FIG. 4 provided to extract regenerated clock pulses. In the indicated paragraph it is asserted that the bandpass filter has a passband (i.e., allows passing only light having wavelength within a certain wavelength interval) including the wavelength λ_c but removes the signal light of wavelength λ_s. If the wavelength λ_s would not be different from the wavelength λ_c the filter described above would not function as described.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 1, 3, 9, 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *All-optical fiber signal processing and regeneration for soliton communications* by Bigo (hereinafter "Bigo"), with reference to U.S. Patent No. 5,323,260 to Alfano et al. ("Alfano"), *Optical Networks: A Practical Perspective* by Ramaswami et al. ("Ramaswami"), *All-optical clock recovery using a mode-locked laser* by Smith et al. ("Smith"), and *All optical clock recovery at bit rates up to 40 Gbit/s* by Ellis et al. ("Ellis").

Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bigo as applied to claim 1, with further reference to *All-optical FM mode-locking of fiber laser* to Greer et al. ("Greer"). Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bigo as applied to claim 1, in further view of U.S. Patent No. 5,548,433 to Smith ("Smith"). Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bigo, in view of Smith and further in view of WO98/08138 which precedes U.S. Patent No. 6,307,984 to Watanabe ("Watanabe").

The newly added feature included in independent claims 1, 14, 15, and 17 is not taught or suggested by the cited prior art.

Alfano discloses that "XMP can be accompanied by degenerate four wave mixing (DFWM) which results in amplification of the probe pulses" (see col. 4, lines 19-21 of Alfano) and "two light pulses with the same frequency but different polarizations and intensities interact in condensed matter in a manner such as to produce compression and amplification of the weaker

pulse" (see col. 4, lines 22-26.) That is, Alfano's pump pulse 50-3 and probe pulses 50-1, 50-2 (see, for example FIG. 4 of Alfano) are generated based on output of laser 13, and both pulses have the same wavelength. Accordingly, Alfano fails to teach or suggest the features recited in amended claim 1. Alfano fails to disclose a probe light having a wavelength different from the signal light.

Bigo's semiconductor optical amplifier (SOA), to which a 20 gb/s pseudo-random binary sequence (PRBS) signal is injected, outputs a clock pulse having a wavelength which is different from the PRBS signal. Therefore, applicants believe that Bigo's SOA cannot be replaced with Alfano's polarizer 59 with a probe pulse 50-3 and pump pulses 50-1 and 50-2. Therefore, amended claim 1 is not rendered obvious over Bigo in view of Alfano, Ramaswami, Smith, and Ellis.

Additionally, Applicant respectfully maintains that "performs amplitude modulation of said continuous wave by said signal light to obtain amplitude-modulated CW light having said wavelength λ_c and including a component of said frequency f_s by four-wave mixing using said signal light as pump light" is not taught or suggested by any of the prior art references alone or in combination, if such a combination were legitimate.

In the "Response to Arguments" section of the outstanding Office Action (mailed on September 20, 2006), the most recent claim amendments are parsed out of context. Therefore, Applicants responds below to the assertions made on pages 3-4 of the outstanding Office Action, relative to claim 1.

In the Office Action it is submitted that Bigo does not discloses the "amplitude modulation," but it is asserted that "KFM performs at least one form of modulation, cross-phase modulation (XPM)." See the last three lines on page 3 of the outstanding Office Action. Further, a chain of statements invoking two other references allegedly builds the argument for the obviousness of the "amplitude modulated CW light" as recited in claim 1. Applicant strongly disagrees because only by impermissible hindsight reconstruction would one of ordinary skill at the time of the invention have combined the four-wave mixing that MAY occur besides the XPM in Alfano with ONE SITUATION that would result in phase matching according to Ramaswami. *In re Rouffet*, 149 F.3d 1350 sets forth criteria for being certain that impermissible hindsight is not being used to deprecate an invention.

> To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner **to show** a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, **confronted with the same**

> **problems as the inventor and with no knowledge of the claimed invention**, would select the elements from the cited prior art references for combination in the manner claimed. [emphasis added]

Applicant respectfully submit that the chain of statements and assertion pick and choose feature and elements of prior art references without providing any motivation for the combination.

Additionally, Alfano discloses:

- "XPM can be accompanied by degenerate four-wave mixing (DFWM) which results in amplification of the probe pulses," in col. 4, lines 19-21
- "two light pulses with the same frequency but different polarization and intensities interact in condensed matter in a manner such as to produce compression and amplification of the weaker pulse," and
- "[the] last term in Eqs. (2a) or (2b) is the degenerate four-wave mixing (DFWM), which modulates the amplitude as well as the phase," in col. 4, line 67 to col. 5, line 2.

However, the amplitude modulation of Alfano is **a modulation of a probe pulse by pump pulse**, which is not a continuous wave. The probe pulse and the pump pulse according to Al[hano must have same frequencies but different polarizations and intensities. Therefore, the four-wave mixing to perform amplitude modulation of continuous wave by a signal light, as recited in claim 1. The probe pulse in Alfano cannot be replaced with a continuous wave because this replacement would be contrary to the stated goal of Alfano, which is compressing and amplifying a probe pulse using XPM and DFWM, which is different from the optical device recited in claim 1.

Alfano, Ramaswami, Ellis, Greer and Smith, alone or in combination, do not correct or compensate for Bigo's failure in teaching or suggesting amplitude-modulating a continuous light by a signal light.

In view of the above arguments and the claim amendments, independent claim 1, and claims 14, 15, and 17, which recite similar features patentably distinguish over the cited prior art. Dependent claims 1, 6-13, 18 and 19, and claim 16 are also patentable at least by inheriting patentable features from claims 1 and 15, respectively, upon which they depend.

Regarding the paragraph starting at line 17, page 4 of the Office Action, which invokes MPEP 2112.01, Applicant respectfully rejects the assertion that Bigo's experimental implementation illustrated in FIG. 9 is substantially identical with FIG. 1 of the present

CONCLUSION

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: Feb. 20, 2007

By: _____

Luminita A. Todor
Registration No. 57,639

1201 New York Ave, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501